

Fisheries Review



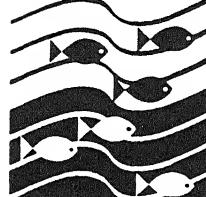
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Fisheries Review is intended to furnish fishery biologists with abstracts of current literature in sport fishery research and management.

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[Ill. Nat. Hist. Surv., 607 East Peabody St., Champaign, IL 61820]

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[P.J. Wejksnora: Dep. Biol. Sci., Univ. Wisconsin, Milwaukee 53201]

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[Dep. Ecol. Genet., Univ. Aarhus, Ny Munkegade, DK-8000 Aarhus C, Denmark]

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[Fish. Res. Div., P.O. Box 297, Wellington, New Zealand]

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[Div. Fishes, Mus. Zool., Univ. Mich., Ann Arbor 48109]

86-001548 Streisinger, G.; F. Singer; C. Walker; D. Knauber and N. Dower. SEGREGATION ANALYSES AND GENE-CENTROMERE DISTANCES IN ZEBRAFISH. *Genetics* 112(2):311-319. 1986. FR 31(2)
[C. Walker: Inst. Molec. Biol., Univ. Oreg., Eugene 97403]

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[U.S. FWS, Great Lakes Fish. Lab., 1451 Green Rd., Ann Arbor, MI 48105]

86-001550 Vasil'ev, V. P. and E. D. Vasil'eva. CRUCIAN CARP, *CARASSIUS CARASSIUS* - A DIPLOID OR TETRAPLOID SPECIES? *Dokl. Biol. Sci. (Engl. Transl.) Dokl. Akad. Nauk SSSR Ser. Biol.* 283(1-6):540-542. 1985. FR 31(2)
[A.N. Severtsov Inst. Evol. Morphol. Anim. Ecol., Acad. Sci. USSR, Moscow, USSR]

86-001551 Villwock, W. [NATURAL HYBRIDIZATION BETWEEN TWO SPECIES OF *APHANIUS* (NARDO, 1827) (PISCES: CYPRINODONTIDAE) FROM THE BARDAWIL LAGOON, NORTHERN SINAI, EGYPT.] *Mitt. Hamb. Zool. Mus. Inst.* 82:311-317. 1985. 1 German with English summ. FR 31(2)
[Zool. Inst., Univ. Hamburg, Martin-Luther-King-Platz 3, D-2000 Hamburg 13, West Germany]

86-001552 Woodman, D. A. MICROGRAPHIC VARIATION IN *RHINICHTHYS CATARACTA* (CYPRINIDAE) IN WESTERN NEBRASKA. *Copeia* 1986(1):219-221. 1986. FR 31(2)
[Sch. Biol. Sci., Univ. Nebr., Lincoln 68588]

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86-001553 Black, G. A. and J. B. Dempson. A TEST OF THE HYPOTHESIS OF PHEROMONE ATTRACTION IN SALMONID MIGRATION. *Environ. Biol. Fishes* 15(3):229-235. 1986. FR 31(2)

[Dep. Fish. Oceans, P.O. Box 5667, St. John's, NF A1G 5X1, Canada] We tested the hypothesis that anadromous salmonids are guided on their homeward migration by population-specific pheromones. Our findings do not support this hypothesis. Wild migrant Arctic charr, *Salvelinus alpinus*, from Ikarut River, Labrador were transferred and held in a tributary previously uninhabited by anadromous fish. None of the charr migrating up Ikarut River entered the tributary after fish were transferred. Similarly, migrant charr, which were caught in Ikarut River and released in the tributary below the captive fish, did not remain in the tributary. We re-evaluated the data which have been used to uphold the concept of pheromone attraction in salmonid migration and concluded that support for the hypothesis is unsubstantiated.

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[Dep. Invest. Zool., Calif. Acad. Sci., Golden Gate Park, San Francisco, 94118]

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[Dep. Biol., Univ. Laval, Ste-Foy, PQ G1K 7P4, Canada]

86-001556 Glova, G. J. INTERACTION FOR FOOD AND SPACE BETWEEN EXPERIMENTAL POPULATIONS OF JUVENILE COHO SALMON (*ONCORHYNCHUS KISUTCH*) AND COASTAL CUTTHROAT TROUT (*SALMO CLARKI*) IN A LABORATORY STREAM. *Hydrobiologia* 131(2):155-168. 1986. FR 31(2)

[Minist. Agric. Fish., P.O. Box 8324, Riccarton, Christchurch, New Zealand]

86-001557 Hara, I. MOVING DIRECTION OF JAPANESE SARDINE SCHOOL ON THE BASIS OF AERIAL SURVEYS. *Bull. Jpn. Soc. Sci. Fish.* 51(12):1939-1945. 1985. FR 31(2)

[Tokai Reg. Fish. Res. Lab., Kachidoki, Chuo, Tokyo 104, Japan]

86-001558 Hasegawa, E. and H. Soeda. [MUTUAL RELATIONSHIP AMONG INDIVIDUALS COMPOSING A FISH SCHOOL.] *Bull. Jpn. Soc. Sci. Fish.* 51(2):1921-1926. 1985. In Japanese with English summ. FR 31(2)

[Coll. Agric. Vet. Med., Nichou Univ., Tokyo 154, Japan]

86-001559 Hourigan, T. F. AN EXPERIMENTAL REMOVAL OF A TERRITORIAL POMACENTRID: EFFECTS ON THE OCCURRENCE AND BEHAVIOR OF COMPETITORS. *Environ. Biol. Fishes* 15(3):161-169. 1986. FR 31(2)

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86-001560 Johansen, P. H. FEMALE PHEROMONE AND THE BEHAVIOR OF MALE GUPPIES (*POECILIA RETICULATA*) IN A TEMPERATURE GRADIENT. *Can. J. Zool.* 63(5):1211-1213. 1985. In English with French summ. FR 31(2)

[Dep. Biol., Queen's Univ., Kingston, ON K7L 3N6, Canada]

86-001561 Johnson, J. H. and P. A. Kucera. SUMMER-AUTUMN HABITAT UTILIZATION OF SUBYEARLING STEELHEAD TROUT IN TRIBUTARIES IN CLEARWATER RIVER, IDAHO. *Can. J. Zool.* 63(10):2283-2290. 1985. In English with French summ. FR 31(2)

[Oreg. Dep. Fish Wildl., P.O. Box 3503, Portland, OR 97208]

86-001562 Johnsrude, C. L. and P. W. Webb. MECHANICAL PROPERTIES OF THE MYOTOMAL MUSCULO-SKELETAL SYSTEM OF RAINBOW TROUT, *SALMO GAIRDNERI*. *J. Exp. Biol.* 119:71-83. 1985. FR 31(2)

[Sch. Nat. Resour., Univ. Mich., Ann Arbor 48109-1115]

86-001563 Jones, K. A. and T. J. Hara. BEHAVIORAL RESPONSES OF FISHES TO CHEMICAL CUES: RESULTS FROM A NEW BIOASSAY. *J. Fish Biol.* 27(4):495-504. 1985. FR 31(2)

[Berkley and Co., Inc., Trilene Dr., Spirit Lake, IA 51360]

86-001564 Kanehiro, H.; M. Suzuki and K. Matuda. [CHARACTERISTICS OF SCHOOLING BEHAVIOR BY THE GROUP SIZE OF ROSE BITTERLING IN THE EXPERIMENTAL WATER TANK.] *Bull. Jpn. Soc. Sci. Fish.* 51(12):1977-1982. 1985. In Japanese with English summ. FR 31(2)

[Dep. Fish. Sci. Technol., Tokyo Univ. Fish., Konan-4, Minato, Tokyo 108, Japan]

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86-001565 Kobayashi, D. R. SOCIAL ORGANIZATION OF THE SPOTTED SHARPNOSE PUFFER, *CANTHIGASTER PUNCTATISSIMA* (TETRAODONTIDAE). *Environ. Biol. Fishes* 15(2):141-145. 1986. FR 31(2)

[Dep. Oceanogr., Univ. Hawaii at Manoa, Honolulu, HI 96822] Tagged individuals of the Eastern Pacific sharpnose puffer, *Canthigaster punctatissima*, were studied at Punta Santa Inez, Baja California Sur Territories were maintained by both sexes in this sexually dimorphic fish. Male puffers appear to have harems; one large male interacts with one to four smaller females. Puffers from different harems were not seen to interact except for occasional aggressive contact. Removal of a male puffer resulted in the overnight takeover of his harem by a neighboring male. Harem-forming behavior is discussed, as well as the possible role of predation.

86-001566 Moring, J. R. and M. E. Moring. A LATE LEPTOCEPHALUS STAGE OF CONGER EEL, *CONGER OCEANICUS*, FOUND IN A TIDEPOOL. *Copeia* 1986(1):222-223. 1986. FR 31(2)

[Me. Coop. Fish. Res. Unit, Dep. Zool., Univ. Me., Orono 04469]

86-001567 Moskal'Kova, K. I. "COPROPHAGY" IN EMBRYOS OF THE BONY FISH *NECOGOBIUS MELANOSTOMUS* (PALLAS) (PISCES, GOBIIDAE). *Dokl. Biol. Sci. (Engl. Transl. Dokl. Akad. Nauk SSSR)* 286(1-6):333-336. 1985. FR 31(2)

[A. N. Severtsov Inst. Evol. Morphol. Anim. Ecol., Acad. Sci. USSR, Moscow USSR]

86-001568 Nunan, C. P. and D. L. G. Noakes. LIGHT SENSITIVITY AND SUBSTRATE PENETRATION BY ELEUTHEROEMBRYOS OF BROOK (*SALVELINUS FONTINALIS*) AND LAKES CHARR (*SALVELINUS NAMAYCUSH*) AND THEIR F1 HYBRID, SPLAKE. *Exp. Biol.* 44(4):221-228. 1985. FR 31(2)

[Dep. Zool., Group Adv. Fish Stud., Univ. Guelph, Guelph, ON, Canada]

86-001569 Paskowski, C. A. and B. L. Olla. SOCIAL INTERACTIONS OF COHO SALMON (*ONCORHYNCHUS KISUTCH*) SMOLTS IN SEAWATER. *Can. J. Zool.* 63(10):2401-2407. 1985. In English with French summ. FR 31(2)

[Dep. Zool., Univ. Alberta, Edmonton, AB T6G 2E9, Canada]

86-001570 Quinn, T. P. and G. M. Tolson. EVIDENCE OF CHEMICALLY MEDIATED POPULATION RECOGNITION IN COHO SALMON (*ONCORHYNCHUS KISUTCH*). *Can. J. Zool.* 64(1):84-87. 1986. In English with French summ. FR 31(2)

[Sch. Fish., WH-10, Univ. Wash., Seattle 98195] To test the hypothesis that population-specific pheromones guide adult salmonids to their natal streams, juvenile and adult coho salmon (*Oncorhynchus kisutch*) were tested for chemosensory responses in two-choice tanks. Coho salmon from Quinsam and Brule Qualicum rivers, British Columbia, Canada, distinguished their own populations from the other. Tagging evidence indicates that straying between these two rivers and a third, geographically intermediate river seldom occurs. Thus population-specific chemicals constitute a potential source of information for homing coho salmon, though their role vis-à-vis imprinted odors from other sources could not be evaluated.

86-001571 Rose, G. A. GROWTH DECLINE IN SUBYEARLING BROOK TROUT (*SALVELINUS FONTINALIS*) AFTER EMERGENCE OF RAINBOW TROUT (*SMOKE GAIRDNERI*). *Can. J. Fish. Aquat. Sci.* 43(1):187-193. 1986. FR 31(2)

[Dep. Biol., McGill Univ., 1205 Dr. Penfield, Montreal, PQ H3A 1B1, Canada]

86-001572 Schaeffer, K. M. LETHAL TEMPERATURES AND THE EFFECT OF TEMPERATURE CHANGE ON VOLITIONAL SWIMMING SPEEDS OF CHUB MACKERAL, *SCOMBER JAPONICUS*. *Copeia* 1986(1):39-44. 1986. FR 31(2)

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[Inter-Am. Trop. Tuna Comm., c/o Scripps Inst. Oceanogr., La Jolla, CA 92093]

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[Dep. Biol., Univ. Saskatchewan, Saskatoon, SK S7N 0WO, Canada]

86-001574 Stauffer, J. R., Jr. ONTOGENETIC CHANGES IN THE PREFERRED TEMPERATURES OF THE BLACKCHIN TILAPIA, *SAROTHERODON MELANOTHERON*. *Arch. Hydrobiol.* 105(3):397-402. 1986. FR 31(2)

[Sch. For. Resour., Pa. State Univ., University Park 16802]

86-001575 Taborsky, M. BREEDER-HELPER CONFLICT IN A CICHLID FISH WITH BROODCARE HELPERS: AN EXPERIMENTAL ANALYSIS. *Behaviour* 95(1-2):45-75. 1985. FR 31(2)

[Max-Planck-Inst. Verhaltensphysiol., D-8131 Seerviesen, West Germany]

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[Inst. Anim. Resour. Ecol., Univ. British Columbia, Vancouver, BC V6T 1W5, Canada]

86-001577 Torricelli, P. and R. Romani. SOUND PRODUCTION IN THE ITALIAN FRESHWATER GOBY, *PADOGOBIUS MARTENSI*. *Copeia* 1986(1):213-216. 1986. FR 31(2)

[Ist. Zool., Univ. Parma, Strada Univ. 12, I-43 100 Parma, Italy]

86-001578 Valentincic, T. CHEMICAL STIMULI, RECEPTORS, AND BEHAVIOUR: ECHINODERMS AND FISHES. *Monit. Zool. It.* 19(3):171. 1985. FR 31(2)

[Dep. Biol., Ljubljana, Yugoslavia]

86-001579 Van den Berg, A. V. ANALYSIS OF THE PHASE DIFFERENCE BETWEEN PARTICLE MOTION COMPONENTS OF SOUND BY TELEOSTS. *J. Exp. Biol.* 119:183-197. 1985. FR 31(2)

[Fysiol. I, Med. Fac., Erasmus Univ., Dr. Molenwaterplein 50, Rotterdam, Netherlands]

86-001580 Wyers, E. J. COGNITIVE-BEHAVIOR AND STICKLEBACKS. *Behaviour* 95(1-2):1-10. 1985. FR 31(2)

[State Univ. N.Y., Stony Brook, NY 11794]

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86-001581 Boëtius, J. GREENLAND EELS, *ANGUILLA ROSTRATA* Le Sueur. *Dana* 4:41-48. 1985. FR 31(2)

[Danish Inst. Fish. Mar. Res., Charlottenlund Castle, DK-2920 Charlottenlund, Denmark]

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86-001582 Creed, R. P., Jr. FEEDING, DIET, AND REPEAT SPAWNING OF BLUEBACK HERRING, *ALOSA AESTIVALIS*, FROM THE CHOWAN RIVER, NORTH CAROLINA. *NOAA Fish. Bull.* 83(4):711-716. 1985. FR 31(2)
[Dep. Zool., Mich. State Univ., East Lansing 48824]

86-001583 Ebert, D. A. BIOLOGICAL ASPECTS OF THE SIXGILL SHARK, *HEXANCHUS GRISEUS*. *Copeia* 1986(1):131-135. 1986. FR 31(2)

[Moss Landing Mar. Lab., P.O. Box 450, Moss Landing, CA 95039] Life history information on 28 sixgill sharks, collected off California, was obtained from May 1982 through Sept. 1984. Only one mature sixgill shark, a 421 cm TL female with term embryos, was examined. Size at maturity was estimated for females by comparing gonad development with length-weight measurements. Gut analysis revealed that the sixgill shark's diet consists mainly of bony and cartilaginous fishes. Since sixgill sharks do not appear to be abundant anywhere, their distribution and movement patterns along the deep coastal waters off California are, for the most part, unknown.

86-001584 Erdman, D. S. THE GREEN STREAM GOBY, *SICYDIUM PLUMIERI*, IN PUERTO RICO. *Trop. Fish Hobbyist* 34(6):70-74. 1986. FR 31(2)

The upstream periodic migration of juvenile gobies, *Sicydium plumieri* (Bloch, 1786), is related to the last quarter moon phase when the postlarvae appear along the sea shore as they approach the river mouth. They begin metamorphosis into juveniles as soon as they reach fresh water. They change from a transparent planktivorous marine fish to a juvenile specialized herbivore and shrink in length during metamorphosis. Juveniles migrate upstream in a long column that can take as much as two days to pass a single point along the river. Juveniles respond to flooding river pulses by rhythmic tail thrashing and climb over cataracts that are inaccessible to native snails and other fishes. When swimming by a tributary stream, certain juveniles indicate homing instinct. Larger adults live in the head waters and presumably spawn among the rocks and boulders. Males in nuptial colors defend territories summer in the fast flowing upland streams.

86-001585 Erokhin, V. G.; Y. I. Gavrenkov and K. A. Kashkin. BIOLOGY OF CHINAI SALMON, *ONCORHYNCHUS KETA* FROM SOUTHERN PRIMORYE. *J. Ichthyol.* (Engl. Transl. *Vopr. Ikhtiol.*) 25(3):44-49. 1985. FR 31(2)

[TINRO, Vladivostok, USSR]

86-001586 Freeman, M. C.; N. Neally and G. D. Grossman. ASPECTS OF THE LIFE HISTORY OF THE FLUFFY SCULPIN, *OLIGOCOTTUS SNYDERI*. *NOAA Fish. Bull.* 83(4):645-655. 1985. FR 31(2)
[School. For. Resour., Univ. Ga., Athens 30602]

86-001587 Gunawardana, J. *ETROPLUS MACULATUS* (ORANGE CHROMIDE) SINHALA RALLIYA, KAHA-KARALIYA. *Loris* 17(1):9. 1985. FR 31(2)
[15A, Stanley Tilakarathna Mawatha, Nugegoda, Sri Lanka]

86-001588 Hall, G. E., (ed.). BIOLOGY AND MANAGEMENT OF THE MUSKELLUNGE. *Amer. Fish. Soc.* 1985. A collection of papers. Available @ \$32.50 from American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199. FR 31(2)

A hardcover printing of research papers presented at the International Muskie Symposium at La Crosse, Wisconsin, April 4-6, 1984. An outstanding reference book on the Muskellunge biology and life history; community interactions; management; culture; catch and release; role of anglers; and future research needs.

86-001589 Lukmanov, E. G.; T. B. Nikiforova and V. P. Ponomarenko. DISTRIBUTION OF MENEK, *BROSME BROSME* (GADIDAE), IN WATERS OF THE NORWEGIAN AND BARENTS SEAS. *J. Ichthyol.* (Engl. Transl. *Vopr. Ikhtiol.*)

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86-OO1589 CONTINUED 25(3):133-139. 1985. FR 31(2)
[Polar Res. Inst. Mar. Fish. Oceanogr., Murmansk, USSR]

86-OO1590 Merritt, N. R. and L. Saldanha. ASPECTS OF THE MORPHOLOGY AND ECOLOGY OF SOME UNUSUAL DEEP-SEA EELS (SYNAPHOBRANCHIDAE, DERICHTHYIDAE AND NETTASTOMATIDAE) FROM THE EASTERN NORTH ATLANTIC. *J. Fish Biol.* 27(6):719-747. 1985. FR 31(2)

[Inst. Oceanogr. Sci., NERC, Wormley, Godalming, Surrey, U.K.]

86-OO1591 Miller, R. DARTERS. *Outdoor Okla.* 42(2):42-45. 1986. FR 31(2)

86-OO1592 Parsons, G. R. NOTES ON THE LIFE HISTORY OF THE CATSHARK, *SCYLIORHINUS MEADI*. *NOAA Fish. Bull.* 83(4):695-696. 1985. FR 31(2)
[Dep. Mar. Sci., Univ. South. Fla., 140 Seventh Ave. South, St. Petersburg, FL 33701]

86-OO1593 Prouzet, P. and J. Gaignon. [CHARACTERISTICS OF ONE SEA WINTER ATLANTIC SALMON STOCK CAUGHT ON ELORN RIVER FROM 1974 TO 1984.] *Rev. Trav. Inst. Peches Marit.* 47(3-4):167-178. 1985. In French with English summ. FR 31(2)

[IFREMER, Cent. Brest, DRV/AP, B.P. 337, 29273 Brest Cedex, France]

86-OO1594 Rothlisberg, P. C. LIFE HISTORY STRATEGIES. *Bull. Mar. Sci.* 37(2):761-762. 1985. FR 31(2)
[CSIRO Mar. Lab., P.O. Box 120, Cleveland, Qld. 4163, Australia]

86-OO1595 Ryon, M. G. THE LIFE HISTORY AND ECOLOGY OF *ETHEOSTOMA TRISELLA* (PISCES: PERCIDAE). *Am. Midl. Nat.* 115(1):73-86. 1986. FR 31(1)

[Chem. Hazard Eval. Prog., Oak Ridge Natl. Lab., Oak Ridge, TN 37831] The trispot darter *Etheostoma trisella* Bailey and Richards occurs only in the Conasauga River and its tributaries in northern Georgia and southeastern Tennessee. It requires two separate but interconnected habitats. When not breeding, *E. trisella* occupies the peripheral zones of the main river in areas of slow current, gravel-silt substrate, and aquatic vegetative or leaf litter cover. In the study area, the breeding habitat is a small clay-bottomed seepage stream with heavy aquatic vegetation and relatively warm water temperatures located in a marshy pasture 2.5 km from the main river. The principal food items in both habitats are Ephemeroptera nymphs and Chironomidae larvae, which account for 19% and 70%, respectively, of the items eaten annually. A relative biomass index indicates more equal contributions from both groups. Parasitism is minimal and predation is not evident. Trispot darters spawn from January to March. Males exhibit bright orange-red and green breeding colors and have tubercles on the anal fin rays. Fecundity estimates range from 56-154 mature eggs per female and up to 292 per female when developing eggs are included. The eggs hatch in 30 days at 12°C and larval development is rapid, reaching the juvenile stage in 41 days. First-year individuals grow to an average size of 36 mm SL. The darters live 2+ years and adults have a 1:1 sex ratio. The uncommon habitat association required for successful reproduction indicates that *E. trisella* is vulnerable to human impact and its threatened species designation is justified.

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86-001596 Saiki, M. K. and C. J. Schmitt. POPULATION BIOLOGY OF BLUEGILLS, *LEPOMIS MACROCHIRUS*, IN LOTIC HABITATS ON THE IRRIGATED SAN JOAQUIN VALLEY FLOOR. *Calif. Fish Game* 71(4):225-244. 1985. FR 31(2)
[U.S. FWS, 6924 Tremont Rd., Dixon, CA 95620]

86-001597 Stauffer, G. D. BIOLOGY AND LIFE HISTORY OF THE COASTAL STOCK OF PACIFIC WHITING, *MERLUCCIUS PRODUCTUS*. *Mar. Fish. Rev.* 47(2):2-7. 1985. FR 31(2)
[NMFS, 7600 Sand Point Way NE, Box C15700, Seattle, WA 98115]

86-001598 Thompson, K. W. DISTRIBUTION AND STATUS OF THE DARTERS OF THE UPPER LITTLE TALLAHATCHIE RIVER DRAINAGE. *J. Miss. Acad. Sci.* 30(Suppl.):80. 1985
Abstract only. FR 31(2)
[Dep. Biol., Univ. Miss., University 38677]

86-001599 Thomsen, K. S. MARGINALIA - A FISHY STORY. *Am. Sci.* 74(2):169-171 1986. FR 31(2)
[Dep. Biol., Yale Univ., New Haven, CT]

86-001600 Vesey, G. and T. E. Langford. THE BIOLOGY OF THE BLACK GOBY, *GOBIUS NIGER* L. IN AN ENGLISH SOUTH-COAST BAY. *J. Fish Biol.* 27(4):417-429. 1985. FR 31(2)
[Mar. Biol. Unit, Fawley Power Stn., Fawley, Southampton, Hampshire England]

86-001601 Yamashita, Y. and T. Aoyama. HATCHING TIME, YOLK SAK ABSORPTION ONSET OF FEEDING, AND EARLY GROWTH OF THE JAPANESE SAND EEL *AMMODYTES PERSONATUS*. *Bull. Jpn. Soc. Sci. Fish.* 51(11):1777-1780. 1985. FR 31(2)
[Ocean Res. Inst., Univ. Tokyo, Nakano, Tokyo 164, Japan]

POPULATION STUDIES, PRODUCTION, RECRUITMENT, ETC.

86-001602 Bailey, K. M. and R. C. Francis. RECRUITMENT OF PACIFIC WHITING *MERLUCCIUS PRODUCTUS*, AND THE OCEAN ENVIRONMENT. *Mar. Fish Rev.* 47(2):8-15 1985. FR 31(2)
[NMFS, 7600 Sand Point Way NE, Box C15700, Seattle, WA 98115]

86-001603 Bart, H. L., Jr. STABILITY AND RESILIENCY OF FISH ASSEMBLAGES IN AN OZARK STREAM. *Ph.D. dissertation, Univ. Okla.* 57p. 1985. From Diss. Abstr. Int. B Sci. Eng. 46(8):2543. 1986. FR 31(2)

86-001604 Basimi, R. A. and D. J. Grove. STUDIES ON FEEDING, GROWTH AND PRODUCTION OF A RECRUITED INSHORE POPULATION OF *PLEURONECTES PLATESSA* (L.) AT EAST ANGLESEY, NORTH WALES. *J. Fish Biol.* 27(6):765-783. 1985. FR 31(2)
[Dep. Mar. Biol., Mar. Sci. Lab., Menai Bridge, Gwynedd, North Wales, U.K.]

86-001605 Beamish, R. J. and G. A. McFarlane. PACIFIC WHITING, *MERLUCCIUS PRODUCTUS*, STOCKS OFF THE WEST COAST OF VANCOUVER ISLAND, CANADA. *Mar. Fish Rev.* 47(2):75-81. 1985. FR 31(2)
[Pac. Biol. Stn., Nanaimo, BC V9R 5K6, Canada]

86-001606 Berg, O. K. THE FORMATION OF NON-ANADROMOUS POPULATIONS OF ATLANTIC SALMON, *SALMO SALAR* L., IN EUROPE. *J. Fish Biol.* 27(6):805-815. 1985. FR 31(2)
[Dep. Zool., Univ. Trondheim, N-7055 Dragvoll, Norway]

86-001607 Condrey, R. E.; G. Adkins and M. W. Wascom. YIELD-PER-RECRUIT OF SPOTTED SEATROUT. *Gulf Res. Rep.* 8(1):63-67. 1985. FR 31(2)
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86-001635 Fraser, J. M. SHOAL SPAWNING OF BROOK TROUT, *SALVELINUS FONTINALIS*, IN A PRECAMBRIAN SHIELD LAKE. *Nat. Can. (Que.)* 112(2):163-174. 1985. In English with French summ. FR 31(2)

[Ontario Minist. Nat. Resour., Res. Sect., Fish. Br., Box 50, Maple, ON L0J 1E0, Canada] Brook trout, *Salvelinus fontinalis*, in Dickson Lake, Ontario, spawn on two shoal areas of approximately 450 m² and 80 m², respectively. The larger spawning bed is a gravel-sand shoal that extends in the form of a semi-circle up to 25 m from the shore in water less than 1 m deep. Spawning fish are apparently attracted to groundwater which seeps slowly up through the shoal at various locations. Females concentrate their redd-digging activities over the seepage areas and, although a few individual redds are distinguishable, the actual spawning bed is made up of contiguous redds which form several irregularly shaped "cleaned" areas on about 25% of the shoal area. Tag and recapture studies, in October 1967, placed the adult population at 1,300 fish averaging 41 cm in length. Spawners ranged from 2+ to 8+ years of age, but 80% were in the 3+ and 4+ classes. The sex ratio was even and egg production averaged 2,300 per female. Spawning occurred from mid-October to late November, with peak egg deposition occurring during the first ten days of November. Hatching occurred during February, and fry emerged from the gravel through March into April. Core samples removed from the spawning bed indicated substantial egg mortality (>30%) due to superimposition of redds. Also, there was evidence of mortality of embryos in late stages of development that was probably related to decreased levels of dissolved oxygen. The limited amount of suitable spawning facilities available to Dickson Lake brook trout has probably limited the size of the population.

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86-001639 LeBec, C. [SEXUAL CYCLE AND FECUNDITY OF COMMON SOLE, *SOLEA VULGARIS* (QUENSEL, 1806) IN BAY OF BISCAY.] *Rev. Trav. Inst. Peches Marit.* 47(3-4):179-189. 1985. In French with English summ. FR 31(2)

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86-001641 Luyten, P. H. and N. R. Liley. GEOGRAPHIC VARIATION IN THE SEXUAL BEHAVIOUR OF THE GUPPY, *POECILIA RETICULATA* (PETERS). *Behaviour* 95(1-2):164-179. 1985. FR 31(2)
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86-001642 Maekawa, K. and H. Onozato. REPRODUCTIVE TACTICS AND FERTILIZATION SUCCESS OF MATURE MALE MIYABE CHARR, *SALVELINUS MALMA MIYABEI*. *Environ. Biol. Fishes* 15(2):119-129. 1986. FR 31(2)
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86-001653 Brewer, G. D. and G. S. Kleppel. DIEL VERTICAL DISTRIBUTION OF FISH LARVAE AND THEIR PREY IN NEARSHORE WATERS OF SOUTHERN CALIFORNIA. *Mar. Ecol. Prog. Ser.* 27(3):217-226. 1986. FR 31(2) [Fish Harbor Mar. Lab., Univ. Calif., 820 South Seaside Ave., Terminal Island, CA 90731]

86-001654 Inoue, Y. and T. Arimoto. [DISTRIBUTION OF FISH SCHOOLS RELEVANT TO SET-NET FISHERIES IN SAGAMI BAY.] *Bull. Jpn. Soc. Sci. Fish.* 51(11):1789-1794. 1985. In Japanese with English summ. FR 31(2) [Natl. Res. Inst. Fish. Eng., Kachidoki, Chuo, Tokyo 104, Japan]

86-001655 Irvine, J. R. EFFECTS OF VARYING DISCHARGE ON THE DOWNSTREAM MOVEMENT OF SALMON FRY, *ONCORHYNCHUS Tshawytscha* WALBAUM. *J. Fish Biol.* 28(1):17-28. 1986. FR 31(2)

[Dep. Fish. Oceans, 4160 Marine Dr., West Vancouver, BC V7V 1N6, Canada] Some of the consequences of varying flows on the downstream migration of salmon fry were investigated in five replicate streams adjacent to the lower Waitaki River, New Zealand. Fluctuating discharge appeared to increase the number of fry moving downstream, provided that mean water velocities at peak flows exceeded 25 cms⁻¹ and that some fry were migrating out of the streams anyway. Salmonids appear to have a lengthier flow-sensitive period than has been proposed in the literature. Research is required to determine whether recently emerged fry that leave parental spawning streams in New Zealand disperse immediately to the ocean or develop and grow for extended periods en route. It may sometimes be feasible and worthwhile to minimize stream flow variations to encourage fry to remain longer in fresh water.

86-001656 Matsumiya, Y.; H. Masumoto and M. Tanaka. ECOLOGY OF ASCENDING LARVAL AND EARLY JUVENILE JAPANESE SEA BASS IN THE CHIKUGO ESTUARY. *Bull. Jpn. Soc. Sci. Fish.* 51(12):1955-1961. 1985. FR 31(2) [Fac. Fish., Nagasaki Univ., Nagasaki 852, Japan]

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[J.D. McCleave: Dep. Zool., Univ. Me., Orono 04469]

FOODS/FEEDING

86-001658 Albers, W. D. and P. J. Anderson. DIET OF PACIFIC COD, *GADUS MACROCEPHALUS*, AND PREDATION ON THE NORTHERN PINK SHRIMP, *PANDALUS BOREALIS*, IN PAVLOF BAY, ALASKA. *NOAA Fish. Bull.* 83(4):601-610. 1985. FR 31(2) [NMFS, 2725 Montlake Blvd. East, Seattle, WA 98112]

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[Mar. Sci. Lab., Menai Budge, Anglesey LL59 5EH, Wales]

86-001660 Bernard, H. J.; J. B. Hedgepeth and S. B. Reilly. STOMACH CONTENTS OF ALBACORE, SKIPJACK, AND BONITO CAUGHT OFF SOUTHERN CALIFORNIA DURING SUMMER 1983. *Calif. Coop. Oceanic Fish. Invest. Rep.* 26:175-182. 1985. In English with Spanish summ. FR 31(2)

[NMFS, P.O. Box 271, La Jolla, CA 92038]

86-001661 Crozier, W. W. OBSERVATIONS ON THE FOOD AND FEEDING OF THE ANGLER-FISH, *LOPHIUS PISCATORIUS* L., IN THE NORTHERN IRISH SEA. *J. Fish Biol.* 27(5):655-665. 1985. FR 31(2)

[Dep. Agric. North. Ireland, Fish. Res. Lab., 38 Castleroe Rd., Coleraine, Northern Ireland]

86-001662 Emmett, R. L.; D. R. Miller and T. H. Blahm. FOOD OF JUVENILE CHINOOK, *ONCORHYNCHUS Tshawtscha*, AND COHO, *O. Kisutch*, SALMON OFF THE NORTHERN OREGON AND SOUTHERN WASHINGTON COASTS, MAY-SEPTEMBER 1980. *Calif. Fish Game* 72(1):38-46. 1986. FR 31(2)

[NMFS, 2725 Montlake Blvd. East, Seattle, WA 98112]

86-001663 Emmons, E. E. DIETS OF WHITE BASS, *MORONE CHRYSOPS*, AND WHITE PERCH, *M. AMERICANA*, FROM TWO INSHORE LAKE ERIE MARSHES. *Ohio J. Sci.* 86(2):54. 1986. Abstract only. FR 31(2)

[Dep. Biol. Sci., Bowling Green State Univ., Bowling Green, OH 43403] Diets of white perch and white bass were compared to assess diet similarity and potential of competition between these two species. White perch, a recent colonizer of Lake Erie, has increased in abundance and may potentially effect native white bass population. Diets of both species were examined in Sheldons's Marsh and Old Woman Creek, two shallow, inshore areas in the central basin of Lake Erie. Fish were collected from April through October, 1983 using trap nets. Comparisons of diets were made using percent composition of prey taxa by number and biomass. Results of these analyses indicated that both species fed on fish, zooplankton, and benthos. Diets differed, however, in that fish prey comprised the major component of white bass diet whereas white perch fed more on zooplankton. Both species fed equally on benthos. These data suggest that white perch and white bass diets do overlap in these inshore areas and that these species may potentially interact.

86-001664 Fyfe, J. L. TROPHIC ANALYSIS OF SIX SPECIES OF FISHES COLLECTED FROM A SUBTROPICAL SALT MARSH FROM EAST CENTRAL FLORIDA. *Fla. Sci.* 49(Suppl. 1):18. 1986. Abstract only. FR 31(2)

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86-001665 Garcia, L. M. and I. R. Adelman. AN *IN SITU* ESTIMATE OF DAILY FOOD CONSUMPTION AND ALIMENTARY CANAL EVACUATION RATES OF COMMON CARP, *CYPRINUS CARPIO* L. *J. Fish Biol.* 27(4):487-493. 1985. FR 31(2)

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86-001666 Gerstmeier, R. [INVESTIGATIONS ON FEEDING ECOLOGY OF FISHES FROM THE NATIONALPARK BERCHTESGADEN (BAVARIA, FEDERAL REPUBLIC OF GERMANY).] *Arch. Hydrobiol. Supplementa*. 72(3):237-386. 1985. In German with English summ. FR 31(2)

[Zool. Staatssammlung, Munchlausenstr. 21, D-8000 Munchen 60, West Germany]

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[Sch. Sci., Univ. Buckingham, Buckingham MK18 1EG, England] Preliminary experiments indicate that serological techniques provide a useful method of identifying specific prey antigens from the stomach contents of fish predators. Problems with cross-reacting antigens from different prey species can be reduced by absorbing anti-sera with tissue extracts of the cross-reacting species. Very small volumes of part-digested prey tissue are sufficient for identification of the prey species when using agarose diffusion plates (Ouchterlony tests).

86-001668 Gophen, M. and U. Pollingher. RELATIONSHIPS BETWEEN FOOD AVAILABILITY, FISH PREDATION AND THE ABUNDANCE OF THE HERBIVOROUS ZOOPLANKTON COMMUNITY IN LAKE KINNERET. *Ergeb. Limnol.* 21:397-405. 1985. FR 31(2)

[Yigal Allon Kinnert Limnol. Lab., P.O.B. 345, Tiberias, 14-102, Israel]

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[Zool. Inst., Univ. Wien, Althanstr. 14, A-1090 Wien, Austria] Chars from seven Austrian lakes (three above the timber line, four in the Austrian lake district Salzkammergut) have been studied. The digestive tract filling

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FOODS/FEEDING (CONTINUED)

86-001683 CONTINUED in percent of body weight is higher among the dwarfed forms in high-mountain lakes than among better growing populations in lower-laying areas. This is an argument against the theory that dwarfed chars suffer starvation. In Mittlerer Plenderlesee, surface food predominates during the ice-free period; under the ice cover chars feed mainly on aquatic insect larvae. In Oberer Plenderlesee the (summer) food is similar. In Drachensee in summer, more chironomid pupae than surface food are taken up, in winter mainly aquatic insect larvae. In the lakes studied in Salzkammergut, chars tend to feed in summer nearly entirely on crustacean-plankton and chironomid pupae; in winter they take more benthic food. In Hallstättersee, however, they seem to be forced out of the plankton zone by coregonids. Fish are only rarely found in the digestive tract.

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86-001868 CONTINUED outlets. c) Sulfate is the dominant anion in precipitation and in the chemistry of these lakes. d) Mass balance calculations at calibrated watersheds (Lake Clara and Lake Vandercook) indicate that more than 90% of hydrogen ions come directly from precipitation. The upper midwest is sensitive to future increases in acid deposition. At the precipitation pH found in the Adirondack Mountains of New York (ph 4.1), about 30% of the lakes would be acidified based on model predictions. The model described here is based on a mass balance for alkalinity in a lake. It was calibrated with field measurements, and the kinetic formulations were based on laboratory experiments reported in the literature on chemical weathering. The model can be used in a steady-state or a time-variable mode to yield the response to scenarios of increasing or decreasing acid deposition. It is a tool that may be used to estimate the lake resources at risk at various levels of acidic deposition.

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[Dep. Zool., Miami Univ., Oxford, OH 45056] Stoneroller minnows, *Campostoma anomalum*, were exposed to four sublethal concentrations of phenol (6, 8, 10, and 12 ppm) for 48 hours, and the effects of these concentrations on temperature tolerance (CTMax) and low dissolved oxygen tolerance were observed. The mean CTMax values of fish exposed to 6 and 8 ppm

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TOXICOLOGY; BIOASSAYS (CONTINUED)

86-001882 CONTINUED phenol (35.6 and 35.3 C, respectively) did not differ from the mean CTMax recorded for control fish (35.8 C). Although fish exposed to 6 ppm phenol exhibited loss of equilibrium at a lower mean dissolved oxygen concentration ($1.5 \text{ mg O}_2 \cdot \text{l}^{-1}$) than the control group ($1.9 \text{ mg O}_2 \cdot \text{l}^{-1}$), the values were not significantly different. Fish exposed to 6 ppm phenol had a significantly greater ($P < 0.05$) mean oxygen tolerance ($1.3 \text{ mg O}_2 \cdot \text{l}^{-1}$) than the control group. Exposure to 10 ppm phenol significantly depressed temperature tolerance (34.7C but did not affect low oxygen tolerance ($1.9 \text{ mg O}_2 \cdot \text{l}^{-1}$). The results of the present study suggest that stoneroller minnows may become more sensitive to increased temperature and decreased dissolved oxygen concentrations following exposure to sublethal concentrations.

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[Great Lakes Fish. Res. Br., Can. Cent. Inland Waters, Burlington, ON L7R 4A6, Canada] The biological half-lives of five dibenzo-p-dioxins and two dibenzofurans were determined in rainbow trout following a single oral exposure. Estimated half-lives ranged from 2 d for 2, 7-dichlorodibenzo-p-dioxin to 43 d for 1, 2, 3, 4-tetrachlorodibenzo-p-dioxin among the dioxins, and from 12 d for octachlorodibenzofuran to 24 d for 3, 6-dichlorodibenzofuran. No consistent relationship was shown between half-life and the degree of chlorination. Absorption efficiencies varied from 2 to greater than 30%, although most values ranged from 5 to 16%.

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In 1979 and 1980 the Fisheries Research Section conducted a 2-year study of Little Emerald Lake and Emerald Lake, collectively called Emerald Lake. Emerald Lake, the third largest natural lake in Colorado, supports a self-sustaining hybrid rainbow-cutthroat trout population originating from the introduction of these two species in the late 1880's. Inlet and outlet spawning habitats, which sustain this trout population, were delineated. In 1980 the inlet stream contained 581 m² of reproductive habitat; the outlet stream contained 805 m² of spawning habitat and 695 m² of reproductive habitat. In 1980 there were 2,985 (\pm 372) adults in the outlet spawning run and 2,357 (\pm 23) adults in the inlet spawning run. Age and growth calculations were based on 9 scales collected from trout at the inlet and outlet weir sites and gillnetting Emerald Lakes. Age groups III, IV, and V made up 93% of the outlet and 83% of the inlet spawning runs. The difference in summer water temperature between inlet and outlet spawning counts, to distinguish between inlet- and outlet-origin spawning sites. As a result it was estimated that 62% of the adults sampled in the Emerald Lakes system had circuli counts that identified them as originating from outlet spawning sites. Creel survey data indicated a

86-001992 CONTINUED average of 888 anglers fished 2,448 hours (20.4 hrs/ha) and harvested 1,114 trout from Emerald Lakes in 1979 and 1980. The average length of trout creelied in 1979 and 1980 was 279 and 298 mm (11.0 and 11.7 inches), respectively. Artificial spawn-taking operations conducted at Emerald Lakes resulted in the introduction of Emerald rainbow into eight additional Colorado waters.

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